Specifications for a HD Buildup Area Mezzanine – East Side

General Description of the Project

These specifications describe a freestanding structural steel mezzanine that will provide first floor test systems support and second level storage in the Heavy Duty Engine Buildup area (400 wing) at the EPA NVFEL in Ann Arbor, Michigan. The general layout of this area and the components in the area is shown on the attached plans and elevations. It is very similar to the mezzanine specified for the WEST side, except the height is lower and the deck area is wider and longer. Only one staircase is required and it is a simpler configuration, possibly without any intermediate landings. A secondary egress shall be provided as well. Most other features, colors, trim, and steel are identical.

The contractor shall design, fabricate, deliver, and install a freestanding mezzanine for the 400 Wing area to provide second level space that is accessible by personnel and provides for forklift loading through several gates. The decking material shall be moisture resistant hardened particleboard coated on the top with a slip resistant finish. The decking material shall be 3/4" tongue and groove high density particle board applied over 1.5" x heavy gauge corrugated steel decking to create a hard smooth slip resistant floor surface for use with pallet movers. This corrugated metal shall be painted white on the underside. The deck shall have a safety railing installed on all exposed sides. Access to the mezzanine shall be provided by a staircase (closed riser, diamond plate tread) and landings as may be required. The mezzanine shall meet all applicable OSHA, BOCA, and UBC codes and the design shall be certified by a Professional Engineer. Two self adhesive stickers with the vendor's name, address, phone number, and the 200 PSF load rating shall be provided to display in a visible location. The framing and decking shall be primed and painted with a dark gray (or optional colors) enamel prior to delivery.

General Description of the Area

These specifications describe a structural steel mezzanine that will be installed in the new HD engine buildup room (400 wing) constructed in 2002-2003 at NVFEL. This mezzanine structure shall be located on the EAST side of this room against the east wall (the new outside metal wall of lab) to provide space for engine and parts storage as well as a canopy for the technician workspace below. The new buildup area has a new 6" reinforced concrete floor.

The general layout of these walls and components in the area is shown on the attached plans and elevations. This new mezzanine will provide approximately 10' of deck along this side of the room and will also provide a structure for the technician workbench areas that are to be located along the ground floor outside metal wall. Lights, ventilation, sprinklers, compressed air drops, electrical outlets, storage cabinets and racks, workbenches, and possible jib cranes for handling heavier pieces are other examples that can be integrated within and on this structure. The center of the 400 wing is shown as open for forklift access used to move heavy engines and test pieces into the cells and in the wing. Forklifts will also be used to load test equipment, engines, and engine pallets onto the new mezzanine deck.

Specification details are as follows: (Please refer to figures and photos)

This EAST mezzanine shall primarily be used for heavy equipment and test engine storage. These items will need to be accessed for retest periodically.

Mezzanine Structure Specifications – HD 400 Wing – EAST Side
(See attached Acrobat.pdf files and photos of the installation area and the existing mezzanine)

Deck Lengths	58’ and 77'	North-South orientation
Deck Width	9.5’ Nominal	East-West orientation, flush to metal panels
Frame Height	115.75" Nominal	Top of joists above concrete floor
Deck Surface	118"	Possible edge support down to 10” girt
Total Deck Area	1282 sqft	Square Feet (see diagram for layout)
Framing	Joist layout	Heavy Duty (16") open web joists or formed C-channels as an alternative shall be spaced on centers and sized per loading specs and configuration layout. Columns and wide flange beams shall be spaced to enable nominal and maximum spans of 20’. All framing shall be the same depth and crossed braced per structural codes. Joist spacing shall be nominally 24”.
Load Capacity	200 PSF	Pounds per square foot (see notes on loads)
Mezz Columns	6"x 6"x 3/16”	Square steel tubes (3/16" wall or greater).
Base plates	12"x 12"x.75”	Welded and optimally positioned for each column. Column centers shall be approximately 7’ as shown on the elevations.
No. of Columns	18 as shown	Decking installed in lengths that are sized to span and butt at east wall. Pieces shall be field cut to go around any building columns or conduits that are along the East wall.
Support Beams	Wide Flange or C-channels	These support beams shall be 96” long and should have a 4" flange width to support the two butting joists. The beams and flange seats shall meets the load ratings and structural code requirements.
Decking Materials	High density PB	ResinDek 62 (or stronger) with a gray gritty surface texture that creates a smooth, sealed surface over 1.5” corrugated steel - 20 gauge (or stronger per load specs) painted white on the underside for light reflectivity and appearance.
Reference website:	ResinDek	www.johnsondoppler.com/material_handling.html
Or	Torbeck Industry	Cincinnati OH 1-800-333-0080

Railings	42" to top rail	Railings shall cover the exposed perimeter of mezzanine. There shall be 3 rails with integral kickplate (see note below on removable pieces) at bottom and painted with yellow enamel. No railing is required at east wall.
Edge Joist Trim	L-shaped plate	The exposed open web joist on the inside mezzanine edge shall be covered with a steel fascia trim piece to cover to the bottom cord of the joist. This shall be integrated with the kick plate and railing supports and attached in a solid manner the entire length of the mezzanine. Paint color shall match columns.
Access Method	Forklift access	Sections on east side of mezzanine shall contain four openings with sliding or removable gates to provide about 6’ clear at each one (two 36” lift out gate) for equipment loading access to this mezzanine. Removable rails may be considered if method is safety approved. The kickplates shall be integral to these pieces for a smooth approach for the forks. Locations shall be determined after contract award.
Staircase	See other units	A staircase shall be provided in the middle of the wing (as shown in the attached drawing) and configured to be unobtrusive This staircase shall have OSHA approved rise and run. The treads shall be 33" or 36” wide closed riser diamond plate with a run of 8.75” and a rise of 7.375” and a tread depth of at least 9.75” (1” overhang) to match the other staircases in the room. Yellow safety rails shall be provided on the stairs and landings per OSHA requirements. Stringers and treads shall be painted to match the enamel color selected for the columns. Color to be specified by Project Officers from available palette. Standard default color shall be dark gray enamel, sprayed on to provide a glossy and durable surface finish.
Egress Ladder	Secondary Means	The vendor shall address and provide a means of secondary egress from this mezzanine at the south end. A slanted ladder with hand rails can be implemented consistent with the allowable space and space required on the mid-landing platform.

Specifications for a HD Buildup Area Mezzanine – West Side

General Description of the Project

These specifications describe a freestanding structural steel mezzanine that will provide first floor test systems support and second level equipment support for the Heavy Duty Engine Test Cell area (west of the 400 wing) at the EPA NVFEL in Ann Arbor, Michigan. The general layout of this area and the components in the area is shown on the attached plans and elevations.

The contractor shall design, fabricate, deliver, and install a freestanding mezzanine for the 400 Wing area to provide second level space that is accessible by personnel and provides for forklift loading through several gates. The decking material shall be moisture resistant hardened particleboard coated on the top with a slip resistant finish. The decking material shall be 3/4" tongue and groove high density particle board applied over 1.5" x heavy gauge corrugated steel decking to create a hard smooth slip resistant floor surface for use with pallet movers. This corrugated metal shall be painted white on the underside. The deck shall have a safety railing installed on all exposed sides. Access to the mezzanine shall be provided by two staircases (closed riser, diamond plate tread) and landings as may be required per space limits. The mezzanine shall meet all applicable OSHA, BOCA, and UBC codes and the design shall be certified by a Professional Engineer. Two self adhesive stickers with the vendor's name, address, phone number, and the 200 PSF load rating shall be provided to display in a visible location. The framing and decking shall be primed and painted with a dark gray (or optional colors) enamel prior to delivery.

General Description of the Area

These specifications describe a structural steel mezzanine that will be installed in the new HD engine buildup room (400 wing) constructed in 2002-2003 at NVFEL. This mezzanine structure shall be located on the WEST side of this room against the wall (previously the outside east metal wall of lab) along the Heavy Duty Engine cells at the EPA Laboratory to provide space for transformers and power converter equipment required for new dynamometers in test cells. Rooms 411 to 427 are called the Heavy Duty Test Area and cover a total area that is approximately 138' x 30' with 20' clear to the building steel. The new buildup area has a new 6" reinforced concrete floor.

The test cell rooms have 4" x 10' high walls that also support a ceiling also made from 4" double metal panels. The area above is open to the 20' high clear span space and the 48" girder trusses on 10' centers 20'-24' above the floor. Rooms 411 to 421 have a structural mezzanine above the 10' ceilings. The general layout of these walls, cells, and components in the area is shown on the attached plans and elevations. This new mezzanine will provide an 8' extension of this deck level and will also provide a structure for the technician workbench areas and gas cylinder storage hoods that are to be located along the ground floor concrete block wall. Lights, ventilation, sprinklers, compressed air drops, electrical outlets, storage cabinets and racks, workbenches, and possible jig cranes for handling heavier pieces are other examples that can be integrated within and on this structure. Open access aisles to the test cell double doors for engine pallet loading directly from the 400 wing shall be facilitated by the structure and provide a shared technician workspace most of the time. The center of the 400 wing is shown as open for forklift access used to move heavy engines and test pieces into the cells and in the wing. Forklifts will also be used to install transformers and drive cabinets on the new mezzanine deck.

Background Information

A freestanding mezzanine (72' x 14' 6" x 147" deck elevation) was installed over Rooms 411 to

417 in January, 1998. This mezzanine was extended in 2001 to cover rooms two additional rooms - 419 and 421. This mezzanine extension was a 34’ 7" x 14’ 6” with a matching 12’ 3” deck elevation and similar joist layout and spacing. The decking material was also 1.25” x 1/8” bars 19W4 steel bar grating painted with black enamel. Open web joists were used instead of the heavy C-channels used in 1998. The deck has a safety railing on the west side, part of which is removable (occasionally - 2 or 3 times per year) for equipment installation or maintenance. The mezzanine meets all applicable OSHA, BOCA, and UBC codes and the design were certified by a Professional Engineer. The framing, decking, and railing were primed and painted with a light gray enamel prior to delivery.

This document describes and specifies an additional extension of this mezzanine area along the entire east side of rooms 411 –427. This space is currently inside a new room constructed for HD engine buildup and preparation. This mezzanine structure will be accomplished by locating support columns at the centerline of each main building column along column line 1, H through N. The location at J needs to be offset to provide a nominal 20’ joist length between the main support beams. The joists shall be 16” or 18” open web and the deck surface shall be heavy gauge corrugated steel (painted white on underside) with _” T/G high-density particleboard on top.

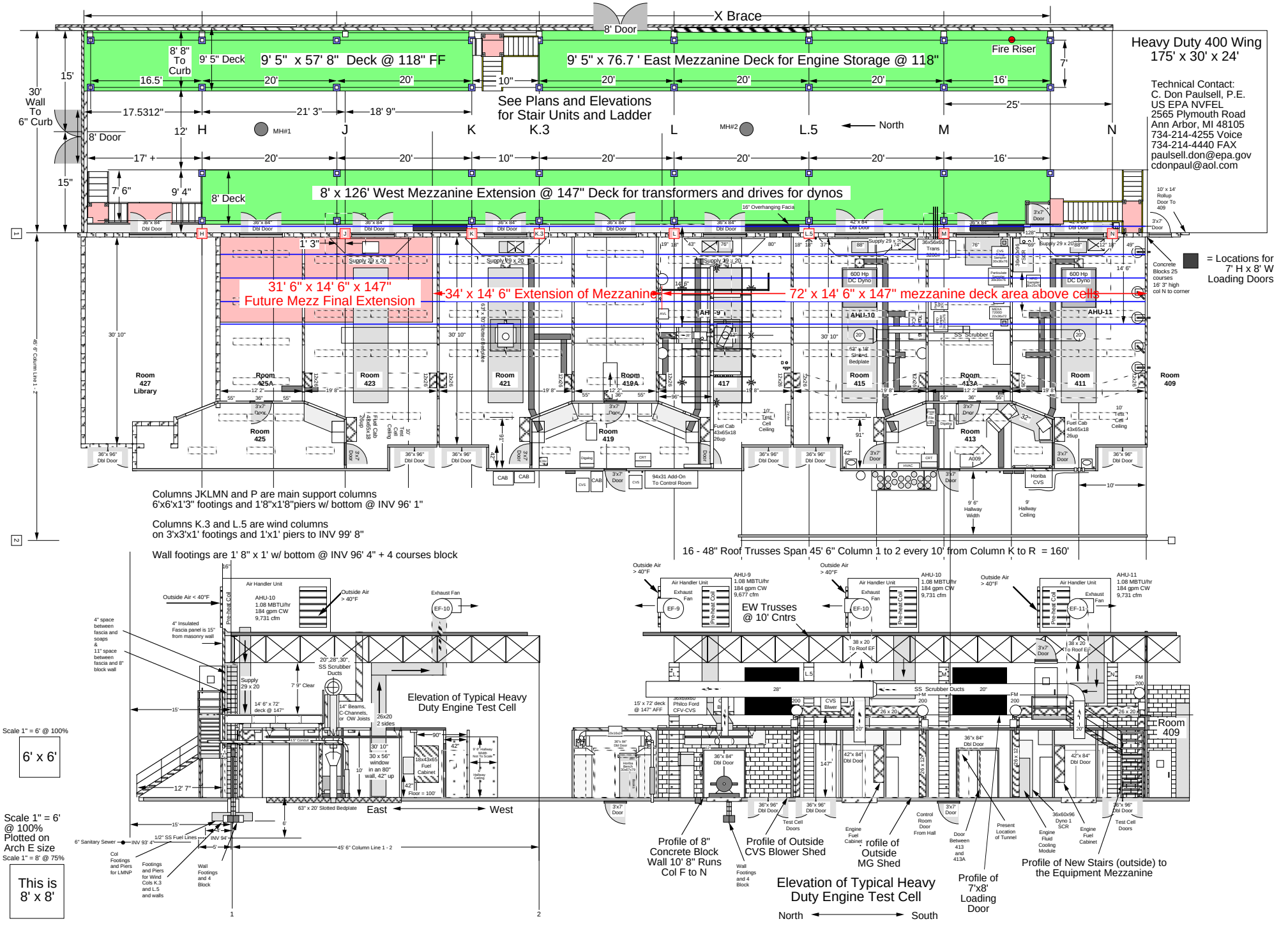
Specification details are as follows: (Please refer to figures and photos)

This mezzanine shall primarily be used for isolation transformers, power converter cabinets and reactors required for the AC flux vectored dynamometers being procured for cells 2 and 4. These dynamometers are to be rated at 750 Hp and 600 Hp and the electrical equipment is projected to weigh about 5000 pounds per system. Other existing transformers and converters may be moved as well to provide more space in the cells and on the equipment mezzanine over the cells.

Mezzanine Structure Specifications – HD 400 Wing Extension - West
(See attached Acrobat.pdf files and photos of the installation area and the existing mezzanine)

Deck Length	126’	North-South orientation
Deck Width	8’ Nominal	East-West orientation
Frame Height	12’ 3/4" Nominal	Top of joists above concrete floor
Deck Surface	147"	Match deck surface to existing interior deck
Total Deck Area	1008 sqft	Square Feet (see diagram for layout)
Framing	Joist layout	Heavy Duty (16") open web joists or formed C-channels as an alternative shall be spaced on centers and sized per loading specs and configuration layout. Columns and wide flange beams shall be spaced to enable nominal and maximum spans of 20’. All framing shall be the same depth and crossed braced per structural codes. Joist spacing shall be nominally 24”. Quotes can be submitted for both alternatives.
Load Capacity	200 PSF	Pounds per square foot (based on heavy loads)
Mezz Columns	6"x 6"x 3/16”	Square steel tubes (3/16" wall or greater).
Base plates	12"x 12"x.75”	Welded and optimally positioned for each column. Column centers shall be approximately 7’ as shown on the elevation. There shall be at least 3” clear between the column and the building metal fascia to route conduits and compressed air lines.
No. of Columns	16 as shown	Decking installed in lengths that are sized to span and butt at west wall with the existing decking. Pieces shall be field cut to go around any conduits that are along the old metal wall.
Support Beams	Wide Flange	These support beams shall be 96” long and

	or C-channels	should have a 4" flange width to support the two butting joists. The beams and flange seats shall meets the load ratings and structural code requirements.
Decking Materials	High density PB	ResinDek 62 (or stronger) with a gray gritty surface texture that creates a smooth, sealed surface over 1.5” corrugated steel - 20 gauge (or stronger per load specs) painted white on the underside for light reflectivity and appearance.
Reference website: Or	ResinDek Torbeck Industry	www.johnsondoppler.com/material_handling.html Cincinnati OH 1-800-333-0080
Railings	42" to top rail	Railings shall cover the exposed perimeter of mezzanine. There shall be 3 rails with integral kickplate (see note below on removable pieces) at bottom and painted with yellow enamel. No railing is required at the old east wall.
Edge Joist Trim	L-shaped plate	The exposed open web joist on the mezzanine edge shall be covered with a steel fascia trim piece to cover to the bottom cord of the joist. This shall be integrated with the kick plate and railing supports and attached in a solid manner the entire length of the mezzanine. Paint color shall match columns.
Access Method	Forklift access	Sections on east side of mezzanine shall contain four openings with sliding or removable gates to provide about 6’ clear at each one (two 36” lift out gate) for equipment loading access to this mezzanine. Removable rails may be considered if method is safety approved. The kickplates shall be integral to these pieces for a smooth approach for the forks. Locations shall be determined after contract award.
Staircase	Two Units	The existing access staircase at the south end now extends too far into the room and needs to be replaced. The vendor shall provide a staircase that will correct this problem and still provide the access to the new mezzanine and access to the first floor test cell doors. This staircase shall be similar to the one at the north end in terms of treads and widths. The second staircase shall be provided at the north end of the wing (as shown in the attached drawing) and has been configured to provide clear access to the double doors into the test cell 427 below the mezzanine. This staircase requires two landings and three connecting stringers that have OSHA approved rise and run. These treads shall be 36” wide closed riser diamond plate with a run of 8.75” and a rise of 7.375” and a tread depth of at least 9.75” (1” overhang). Yellow safety rails shall be provided on the stairs and landings per OSHA requirements. Stringers and treads shall be painted to match the enamel color selected for the columns. Color to be specified by Project Officers from available palette. Standard default color shall be dark gray enamel, sprayed on to provide a glossy and durable surface finish.


X Brace
8' Door
Fire Riser
Heavy Duty 400 Wing
175' x 30' x 24'
Technical Contact:
C. Don Paulsell, P.E.
US EPA NVFEL
2565 Plymouth Road
Ann Arbor, MI 48105
734-214-4255 Voice
734-214-4440 FAX
paulsell.don@epa.gov
cdonpaul@aol.com
8' 8" To Curb
9' 5" Deck
9' 5" x 57' 8" Deck @ 118" FF
9' 5" x 76.7 ' East Mezzanine Deck for Engine Storage @ 118"
See Plans and Elevations for Stair Units and Ladder
North
MH#1
MH#2
8' Door
8' Deck
8' x 126' West Mezzanine Extension @ 147" Deck for transformers and drives for dynos
31' 6" x 14' 6" x 147" Future Mezz Final Extension
34' x 14' 6" Extension of Mezzanine
72' x 14' 6" x 147" mezzanine deck area above cells
= Locations for 7' H x 8' W Loading Doors
Columns JKLMN and P are main support columns
6'x6'x1'3" footings and 1'8"x1'8"piers w/ bottom @ INV 96' 1"
Columns K.3 and L.5 are wind columns
on 3'x3'x1' footings and 1'x1' piers to INV 99' 8"
Wall footings are 1' 8" x 1' w/ bottom @ INV 96' 4" + 4 courses block
16 - 48" Roof Trusses Span 45' 6" Column 1 to 2 every 10' from Column K to R = 160'
EW Trusses @ 10' Cntrs
Elevation of Typical Heavy Duty Engine Test Cell
East
West
Scale 1" = 6' @ 100%
6' x 6'
Scale 1" = 6' @ 100% Plotted on Arch E size
Scale 1" = 8' @ 75%
This is 8' x 8'
Profile of 8" Concrete Block Wall 10' 8" Runs Col F to N
Profile of Outside CVS Blower Shed
rofile of Outside MG Shed
Profile of 7'x8' Loading Door
Profile of New Stairs (outside) to the Equipment Mezzanine
Elevation of Typical Heavy Duty Engine Test Cell
North
South
9' 5" x 57' 8" Deck @ 118" FF

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US EPA NVFEL
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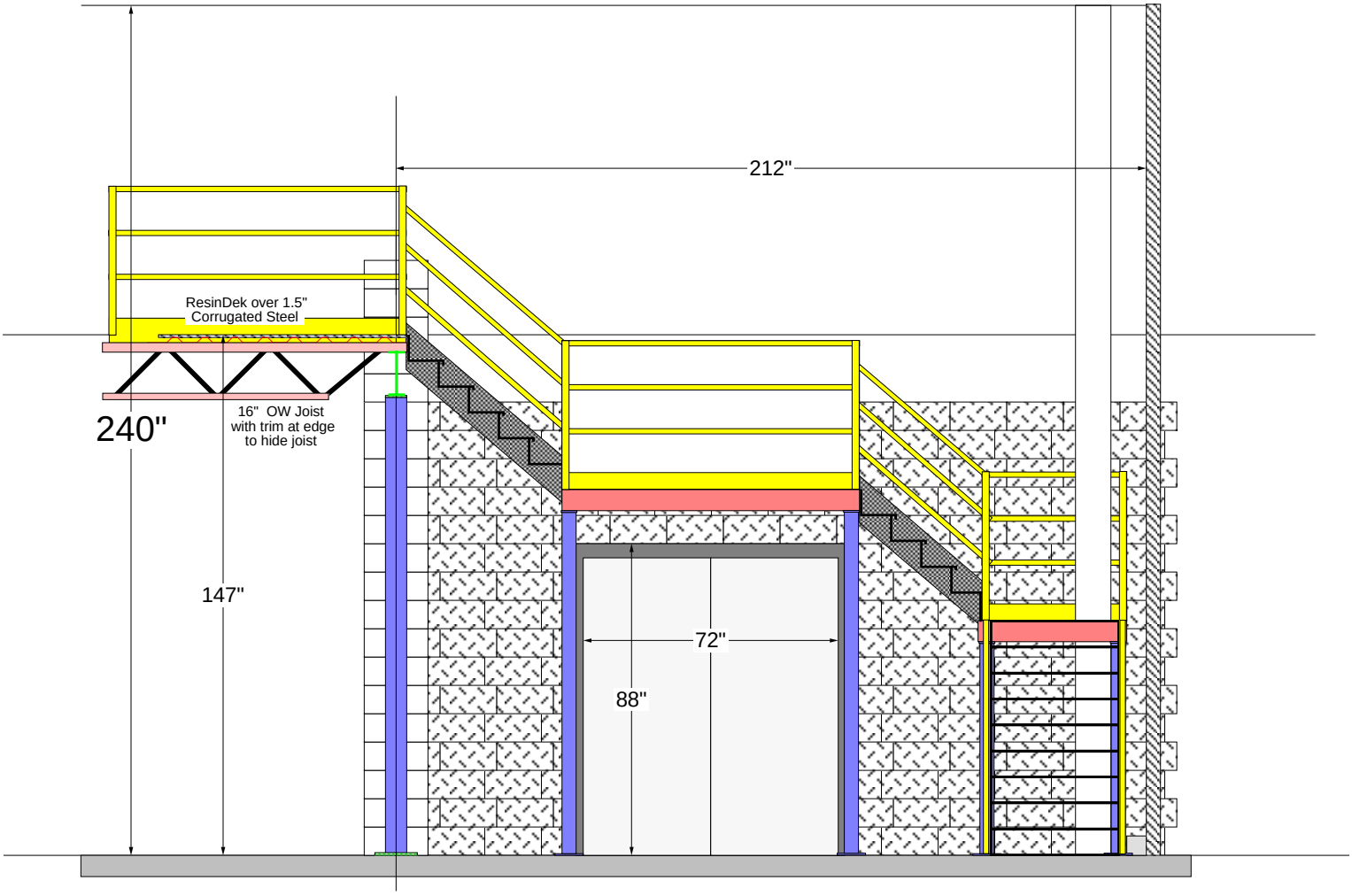
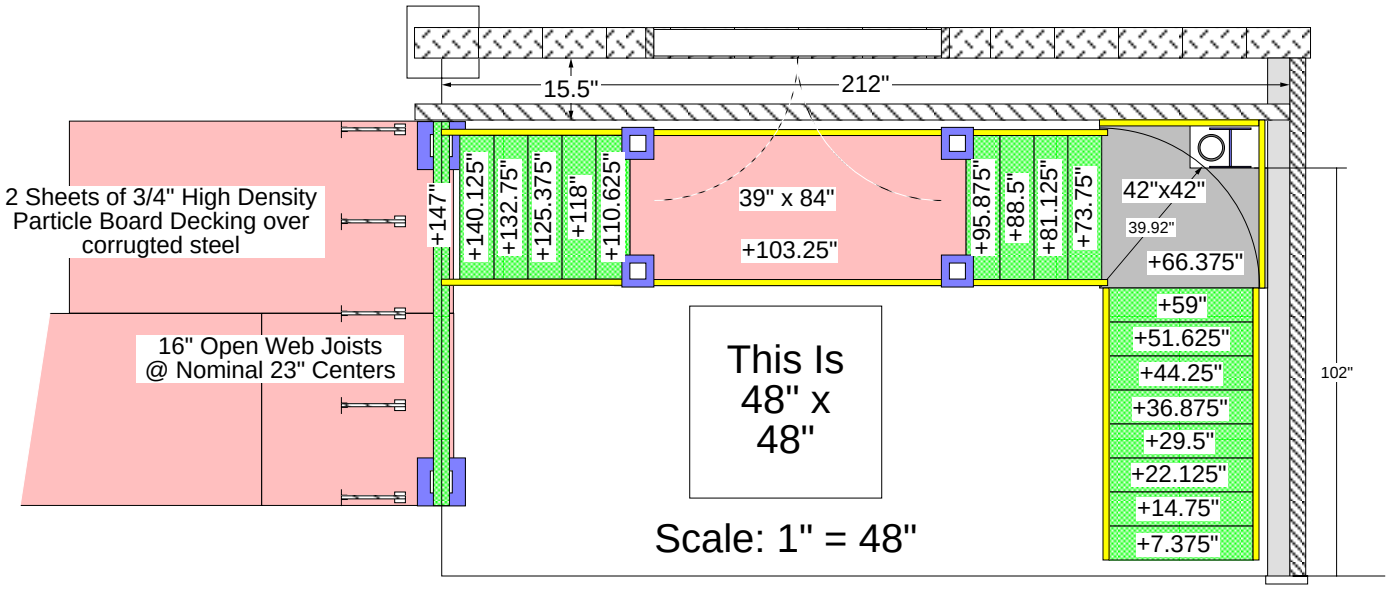
734-214-4440 FAX
paulsell.don@epa.gov
cdonpaul@aol.com

Staircase and Landing for Northwest Corner of Heavy Duty Engine Prep Wing For Access To West Mezzanine





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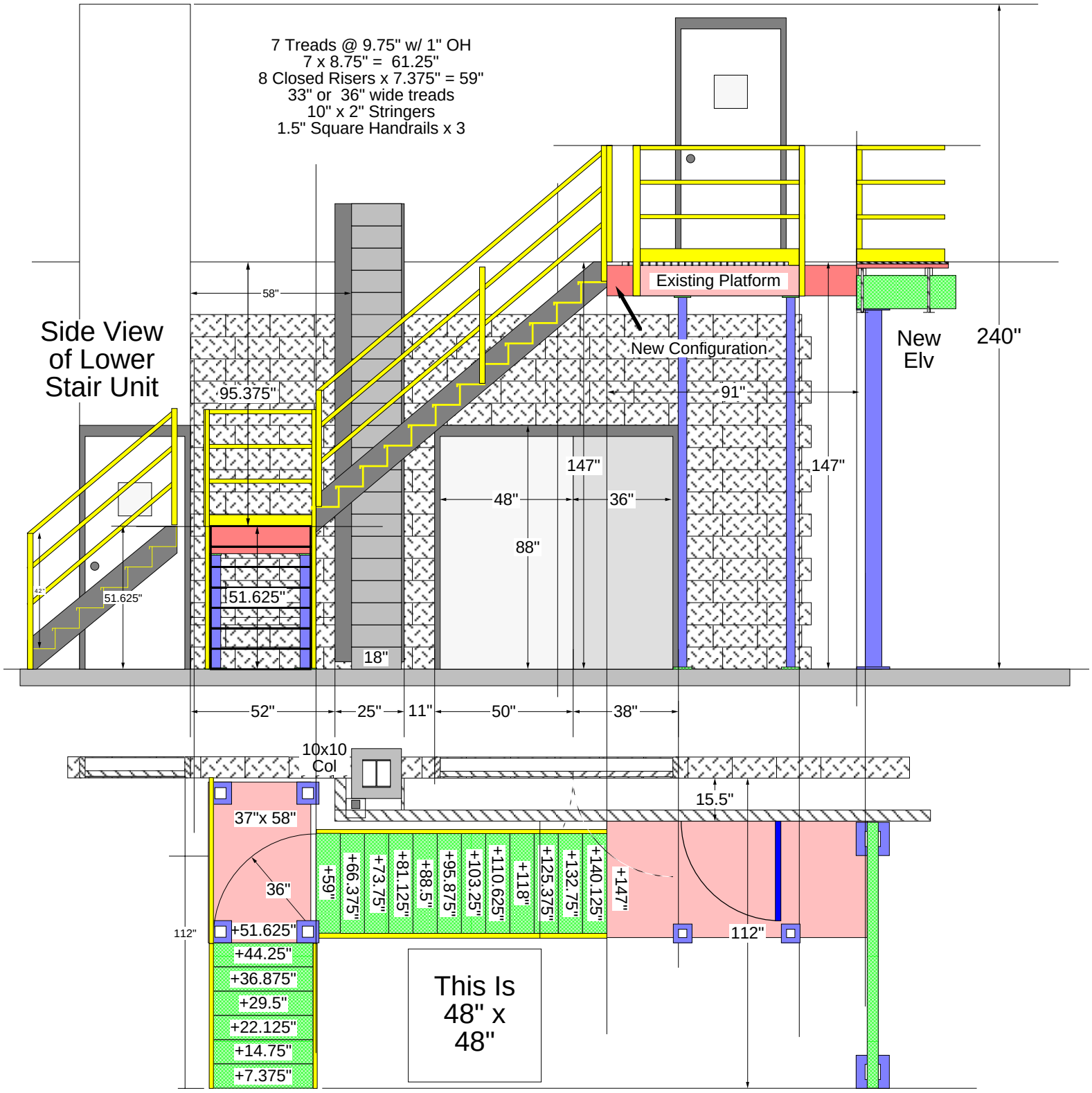
C. Don Paulsell, P.E.
US EPA NVFEL
2565 Plymouth Road
Ann Arbor, MI 48105
734-214-4255 Voice
734-214-4440 FAX
paulsell.don@epa.gov
cdonpaul@aol.com

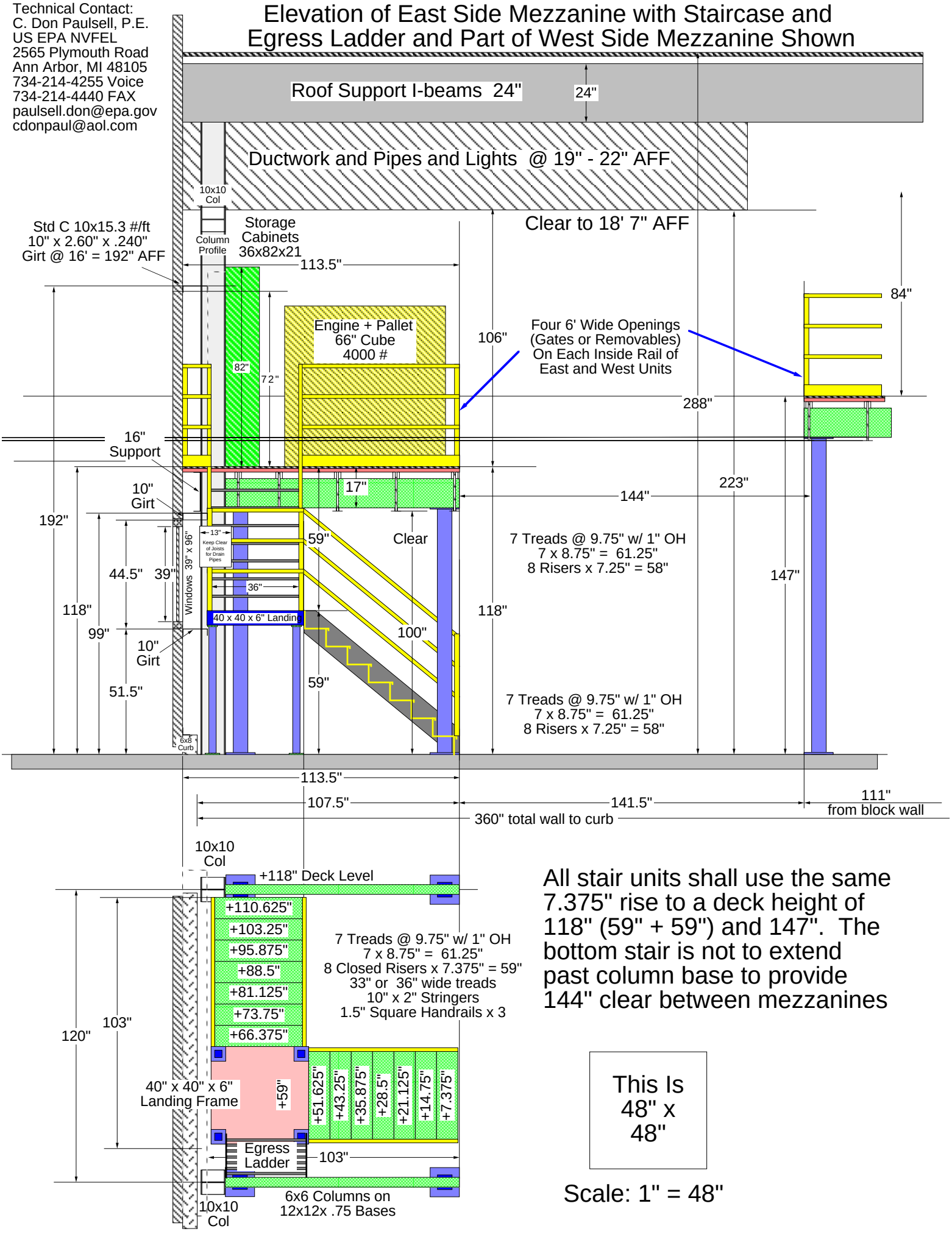
Replacement Staircase and Landing for Southwest Corner of Heavy Duty Engine Prep Wing For Access To West Mezzanine and Interior



Scale: 1" = 48"

Technical Contact:
C. Don Paulsell, P.E.
US EPA NVFEL
2565 Plymouth Road
Ann Arbor, MI 48105
734-214-4255 Voice
734-214-4440 FAX
paulsell.don@epa.gov
cdonpaul@aol.com

Elevation of East Side Mezzanine with Staircase and Egress Ladder and Part of West Side Mezzanine Shown

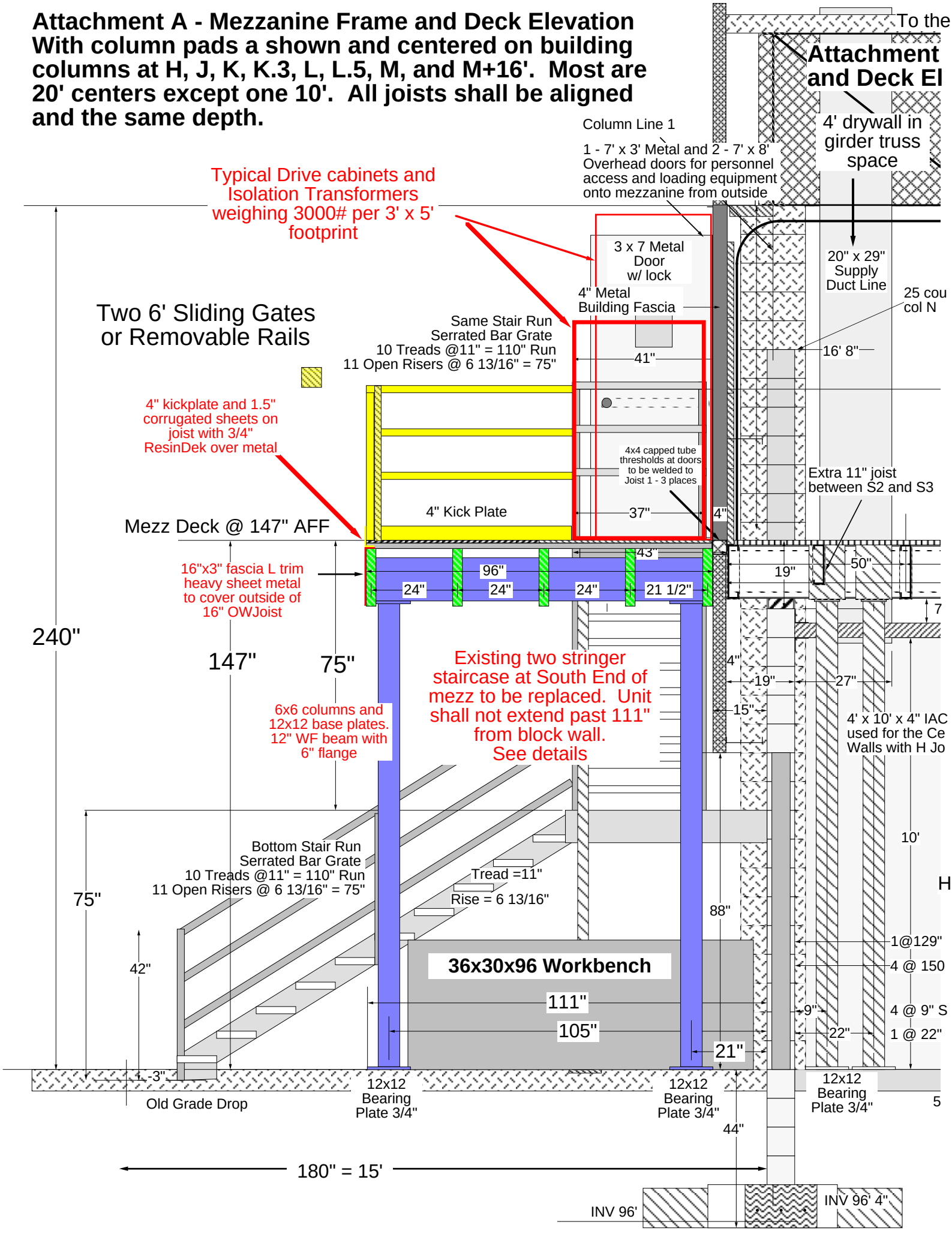


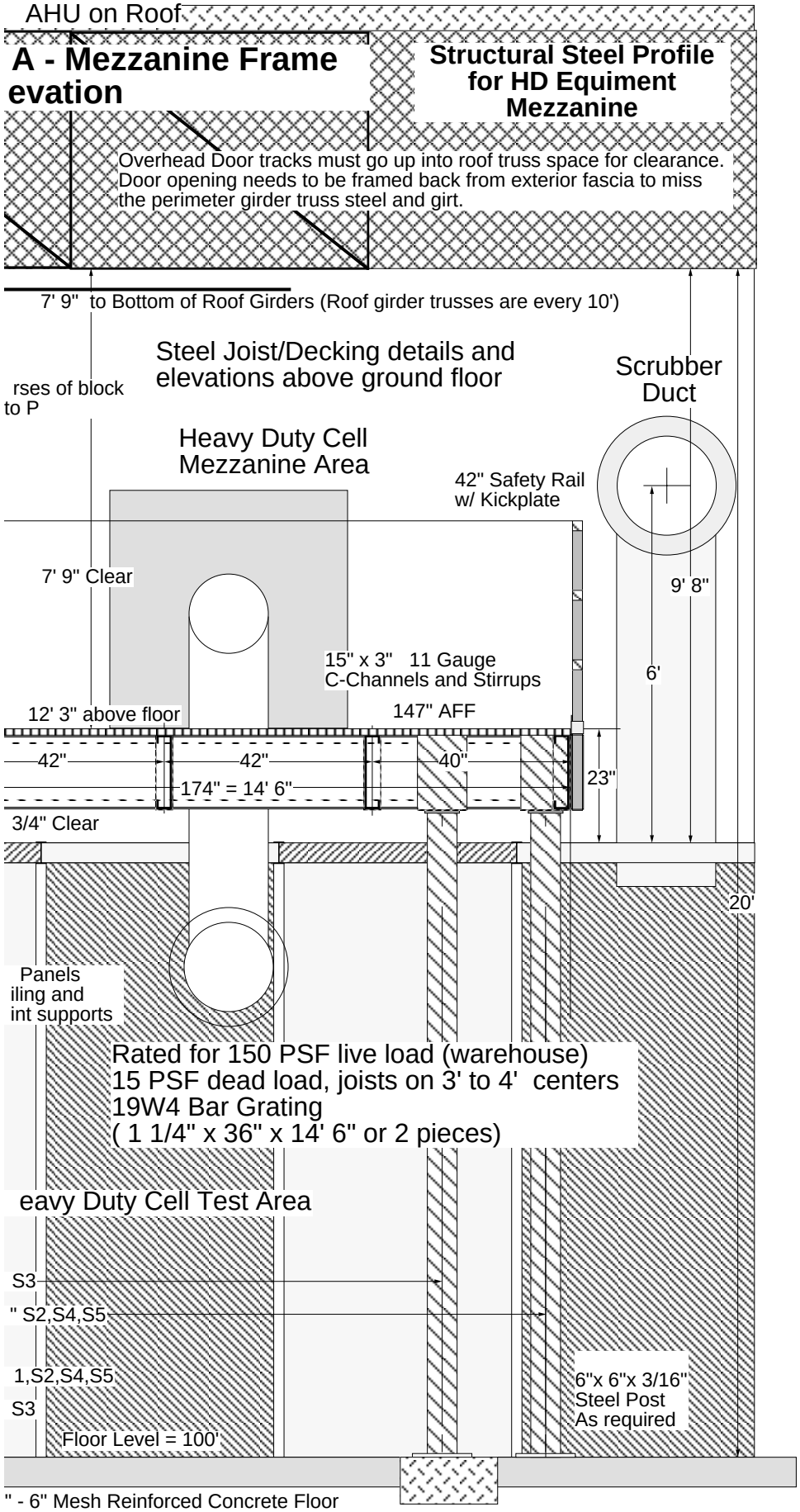
All stair units shall use the same 7.375" rise to a deck height of 118" (59" + 59") and 147". The bottom stair is not to extend past column base to provide 144" clear between mezzanines

This Is 48" x 48"

Scale: 1" = 48"

Attachment A - Mezzanine Frame and Deck Elevation With column pads a shown and centered on building columns at H, J, K, K.3, L, L.5, M, and M+16'. Most are 20' centers except one 10'. All joists shall be aligned and the same depth.





East Block Wall 16 Coures of 8" Block above grade, 4 courses below to 12' x 20" perimeter foundation w/ bottom @ INV 96' 4"

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